



Billing Code: 4310-55

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[Docket No. FWS–R7–ES–2014–0031]

[FF07CMM00–FX–FR133707SEA00]

Marine Mammals; Incidental Take During Specified Activities; Proposed Incidental Harassment Authorization

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of receipt of application and proposed incidental harassment authorization; request for comments.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), have received applications from Apache Alaska Corporation (Apache), SAExploration, Inc., LLC (SAE), and BlueCrest Energy, Inc. (BlueCrest), formerly Buccaneer Alaska Operations, LLC, for authorization under the Marine Mammal Protection Act of 1972 (MMPA), as amended, to take small numbers of northern sea otters from the Southcentral stock by harassment incidental to proposed oil and gas

exploration activities in Cook Inlet, Alaska. In accordance with provisions of the MMPA, we request comments on our proposed authorization for the applicant to incidentally take, by harassment, small numbers of northern sea otters from the Southcentral stock for a period of 1 year. We anticipate no take by injury or death and include none in this proposed authorization, which would be for take by harassment only.

DATES: Comments and information must be received by [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: *Document availability:* The incidental harassment authorization applications, associated environmental assessments, and supporting documentation, such as Literature Cited, are available for viewing at <http://www.fws.gov/alaska/fisheries/mmm/iha.htm> or at www.regulations.gov at Docket No. FWS–R7–ES–2014–0031.

Comment submission: You may submit comments on the proposed Incidental Harassment Authorization and associated environmental assessments by one of the following methods:

- U.S. mail or hand-delivery: Public Comments Processing, ATTN: FWS–R7–ES–2014–0031, U.S. Fish and Wildlife Service Headquarters, MS: BPHC, 5275 Leesburg Pike, Falls Church, VA 22041–3803; or
- Federal eRulemaking Portal: <http://www.regulations.gov>. Follow the instructions for submitting comments to Docket No. FWS–R7–ES–2014–0031.

Please indicate to which document, the proposed Incidental Harassment Authorization, or the environmental assessments, your comments apply. We will post all comments

on <http://www.regulations.gov>. This generally means that we will post any personal information you provide us (see the Request for Public Comments section below for more information).

FOR FURTHER INFORMATION CONTACT: To request copies of the application, the list of references used in the notice, and other supporting materials, contact Craig Perham, 1–800–362–5148; Marine Mammals Management, U.S. Fish and Wildlife Service, 1011 East Tudor Road, Anchorage, AK 99503; or by e-mail at craig_perham@fws.gov.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA, as amended (16 U.S.C. 1371 (a)(5)(A) and (D)), authorize the Secretary of the Interior to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region, provided that we make certain findings and either issue regulations or, if the taking is limited to harassment, provide a notice of a proposed authorization to the public for review and comment.

We may grant authorization to incidentally take marine mammals if we find that the taking will have a negligible impact on small numbers of the species or stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses. As part of the authorization process, we prescribe permissible methods of taking, and other means of

effecting the least practicable impact on the species or stock and its habitat, and requirements pertaining to the monitoring and reporting of such takings.

The term “take,” as defined by the MMPA, means to harass, hunt, capture, or kill, or to attempt to harass, hunt, capture, or kill any marine mammal. Harassment, as defined by the MMPA, means “any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [the MMPA calls this Level A harassment], or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [the MMPA calls this Level B harassment].”

The terms “small numbers,” “negligible impact,” and “unmitigable adverse impact” are defined in 50 CFR 18.27, the Service’s regulations governing take of small numbers of marine mammals incidental to specified activities. “Small numbers” is defined as “a portion of a marine mammal species or stock whose taking would have a negligible impact on that species or stock.”

However, we do not rely on that definition here, as it conflates the terms “small numbers” and “negligible impact,” which we recognize as two separate and distinct requirements. Instead, in our small numbers determination, we evaluate whether the number of marine mammals likely to be taken is small relative to the size of the overall population. “Negligible impact” is defined as “an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.” “Unmitigable adverse impact” is defined as “an impact resulting from the specified activity (1) that is likely to reduce the availability of the species to a level

insufficient for a harvest to meet subsistence needs by (i) causing the marine mammals to abandon or avoid hunting areas, (ii) directly displacing subsistence users, or (iii) placing physical barriers between the marine mammals and the subsistence hunters; and (2) that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.”

Section 101(a)(5)(D) of the MMPA establishes an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals where the take will be limited to harassment. Section 101(a)(5)(D)(iii) establishes a 45-day time limit for Service review of an application, followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of marine mammals. Within 45 days of the close of the comment period, we must either issue or deny issuance of the authorization. We refer to these authorizations as Incidental Harassment Authorizations (IHAs).

The Service has issued IHAs for sea otters in the past. These include: three IHAs incidental to airport construction on Akun Island and hovercraft operation between Akun Island and Akutan, Alaska (August 27, 2008 [73 FR 50634]; June 8, 2010 [75 FR 32497]; April 1, 2011 [76 FR 18232]); and one IHA incidental to construction activities associated with a tidal wetlands restoration project on the Elkhorn Slough National Estuarine Research Reserve in Monterey County, CA (July 20 2010 [75 FR 42121]).

Summary of Requests

Apache Corporation

On April 15, 2014, the Service received an application from Apache Corporation (Apache) to take, by harassment, northern sea otters from the Southcentral stock (*Enhydra lutris kenyoni*; hereafter referred to as sea otter) incidental to a three-dimensional (3D) nodal or ocean-bottom node seismic survey program in State waters of lower Cook Inlet, Alaska. Apache plans to conduct the seismic surveys, south of Ninilchik, starting in mid-October 2014 during open water periods at slack tides. The proposed seismic surveys would take place on Apache's leases, which encompass approximately 4,882 square kilometers (km) (1,885 square miles (mi)) in water depths of 0 to 128 meters (m) (0 to 420 feet (ft)) of onshore, transition (intertidal), and offshore zones (Figure 1). These areas are identified in Apache's application as Area 2.

SAExploration, Inc.

On October 28, 2013, the Service received an application from SAExploration, Inc. (SAE) for the taking, by harassment, of sea otters from the Southcentral stock incidental to a 3D nodal or ocean-bottom node seismic survey program in State and Federal waters in lower Cook Inlet starting on December 1, 2014. The surveys will conclude before the IHA expires. The proposed seismic survey would occur in the marine waters of both upper and lower Cook Inlet. The survey area is divided into two units: (1) upper Cook Inlet, an area of 2,126 square km (821 square mi) beginning at Point Possession, to a line approximately 10 km (6 mi) south of both the West Foreland and East Foreland; and (2) lower Cook Inlet, a 1,808-square-km (698-square-mi)

area beginning east of Kalgin Island and running along the east side of lower Cook Inlet to Anchor Point. We focused on the lower Cook Inlet area because sea otters do not occur in upper Cook Inlet (Figure 1).

BlueCrest

On April 15, 2014, Buccaneer/BlueCrest Alaska Operations, LLC (BlueCrest) submitted an IHA application to the Service requesting take of small numbers of sea otters from the Southcentral stock during the Cosmopolitan exploratory drilling program in lower Cook Inlet during the November 1, 2014, through October 31, 2015, period. These two well locations (Cosmopolitan State #1 and Cosmopolitan State #2; Figure 1) are within the State of Alaska Division of Land Oil and Gas Lease 384403.

These applications are available as specified above in **ADDRESSES**.

Prior to issuing IHAs in response to these three requests, we must evaluate the level of industrial activities described in the applications, their associated potential impacts to sea otters, and their effects on the availability of this species for subsistence use. The information provided by the applicants indicates that oil and gas activities projected over the next year will encompass onshore and offshore exploration activities. The Service is tasked with analyzing the impact that lawful industrial activities will have on sea otters during normal operating procedures.

Description of the Specified Activities

Apache Corporation

Apache will perform the proposed seismic survey operations from multiple vessels starting in mid-October 2014. Two source vessels will be used, both equipped with compressors and 2,400-cubic-inch airgun arrays. One source vessel also will be equipped with a 440-cubic-inch shallow-water airgun array, which can be deployed at high tide in the intertidal area in less than 1.8 m (5.9 ft) of water. Three shallow draft vessels and one mitigation vessel will support cable/nodal deployment and retrieval operations. One vessel will house and recharge the receiver nodes, and two smaller jet boats will be used for personnel transport and node support in the extremely shallow water of the intertidal area. For additional information, such as vessel specifications, see Apache's application (<http://alaska.fws.gov/fisheries/mmm/itr.htm>).

Apache anticipates conducting in-water survey operations 24 hours per day. During each 24-hour period, seismic operations will be active; however, in-water airgun activity can occur only during slack tides because of the strong currents. In general, there are four slack tides in a 24-hour period and airguns can typically operate for 2–3 hours around each slack tide, yielding a maximum of 8–12 hours of airgun operations in a given day.

The 2,400-cubic-inch airgun arrays and the 440-cubic-inch airgun array will be used to obtain geological data during the survey. The acoustic source level of the 2,400-cubic-inch airgun array was predicted using an airgun array source model developed by JASCO Applied Sciences. The 190, 180, and 160 dB_{rms} re 1 µPa (standard industry reference for sound pressure levels) isopleths

were estimated at three different water depths (5 m, 25 m, and 45 m; 16.4 ft, 82 ft, 147.6 ft) for nearshore surveys and at 80 m (262.5 ft) for channel surveys. The distances to these thresholds for the nearshore survey locations are provided in Table 1 and correspond to the three transects modeled at each site in the onshore, nearshore, and parallel-to-shore directions.

Table 1. Distances to sound thresholds for nearshore surveys for the 2014 Apache seismic survey, lower Cook Inlet, Alaska.

Sound Level Threshold (dB re 1 μ Pa)	Water Depth at Source Location (m)	Distance in the Onshore Direction (km)	Distance in the Offshore Direction (km)	Distance in the Parallel-to-Shore Direction (km)
160	5	0.85	3.91	1.48
	25	4.70	6.41	6.34
	45	5.57	4.91	6.10
190	5	0.28	0.33	0.33
	25	0.35	0.36	0.44
	45	0.10	0.10	0.51

An acoustical positioning (or pinger) system will be used to determine the geo-referenced positions of the nodes after they have been placed on the seafloor. One device, the Scout Ultra-Short Baseline Transceiver, operates at frequencies of 33–55 kilohertz (kHz) at a maximum source level of 188 dB re 1 μ Pa at 1 m. The other device, an LR Ultra-Short Baseline Transponder, operates at frequencies of 35–50 kHz at a source level of 185 dB re 1 μ Pa at 1 m. With respect to these two sound sources, the Service will rely on the distance to the Level B harassment threshold for sea otters estimated for the higher sound pressure level of the two devices as provided by Apache. Therefore, assuming a simple spreading loss of $20 \log R$ (where R is radius) with a source level of 188 dB, the distances to the 190 and 160 dB isopleths would

be 1 m and 25 m (3.2 ft and 82 ft), respectively. Another technique for locating the nodes in deeper water is called Ocean Bottom Receiver Location, which uses a small volume airgun (10 cubic inches) firing parallel to the node line.

Apache will also conduct seismic survey activities in onshore and intertidal areas that will be surveyed using nodal technology and explosives as the sound source. To access the onshore drill sites, Apache will use a combination of helicopter portable and tracked vehicle drills. In September 2011, Apache conducted sound source verification to characterize the underwater received sound levels resulting from land-based explosives. Shot locations for the land-based explosives were acoustically monitored to determine if underwater received sound levels exceeded the harassment threshold of 160 dB re 1 μ Pa. Received levels detected by the real-time vessel-based data logging systems located 3 km (1.86 mi) from the nearest shot hole were well below the harassment threshold criterion of 160 dB re 1 Pa rms. A detailed description of the proposed seismic survey activities in onshore and intertidal areas can be found in Apache's Environmental Assessment (EA).

SAExploration, Inc.

SAExploration plans to conduct 3D nodal or ocean-bottom node seismic surveys in State and Federal waters within both upper and lower Cook Inlet. The seismic acquisition in the lower Cook Inlet unit would initially begin in December 2014, and start in the northern half of their action area to avoid encounters with summering marine mammals near Anchor Point. Completing this work in the lower Cook Inlet unit is estimated to take 60 to 80 days.

Two source vessels will be used with multiple jet-driven shallow draft vessels for deployment and retrieval of offshore recording equipment. There will also be a housing vessel with a crew transfer and mitigation vessels (see SAE's EA for more details regarding specifications of these vessels). The components of the project include laying nodal recording sensors (nodes) on the ocean floor, operating seismic source vessels towing active airgun arrays, and retrieval of nodes.

SAExploration's seismic surveys will primarily utilize a 1,760-cubic-inch sleeve airgun array, although 440- or 880-cubic-inch arrays may be used in shallow water locations. The configuration of each array is outlined in SAE's application (<http://alaska.fws.gov/fisheries/mmm/itr.htm>). The arrays will be centered approximately 15 m (50 ft) behind the source vessel, at a depth of 4 m (12 ft), and towed along predetermined source lines at speeds between 7.4 and 9.3 km per hour (4 and 5 knots). SAE proposes to operate two vessels with full arrays, operating simultaneously in an alternating shot mode; one vessel shooting while the other is recharging. Shot intervals are expected to be about 8 to 10 seconds for each array, resulting in an overall shot interval of 4 to 5 seconds, considering the two simultaneous arrays. Actual daily shooting will be confined to 2 to 3 hours at each slack tide occurring during daylight hours, or about 8 to 10 hours at most in a given day. Based on the manufacturer's specifications, the 1,760-cubic-inch array has a peak-to-peak estimated sound source of 254.55 dB re 1 μ Pa at 1 m.

SAExploration's marine seismic operations will be based on a "recording patch" or similar approach. Patches will contain groups of 6 receiver lines and 32 source lines. Each receiver line

has submersible marine nodes tethered equidistant (50 m; 165 ft) from each other along the length of the line. Each node will contain three velocity sensors and a hydrophone. The receiver lines will be approximately 8 km (5 mi) in length, and spaced approximately 402 m (1,320 ft) apart. Each receiver patch will cover approximately 19.4 square km (7.5 square mi) in area. The receiver patches will be oriented such that the receiver lines run parallel to the shoreline.

Source lines, 12 km (7.5 mi) long and spaced 502 m (1,650 ft) apart, will run perpendicular to the receiver lines and, where possible, will extend approximately 5 km (3 mi) beyond the outside receiver lines and approximately 4 km (2.5 mi) beyond each of the ends of the receiver lines. The outside dimensions of the maximum shot area during a patch shoot will be 12 km by 16 km (7.5 mi by 10 mi) and all shot areas will be wholly contained within the 1,808-square-km (698-square-mi) survey box. Shot intervals along each source line will be 50 m (165 ft).

It may take a period of 3 to 5 days to deploy, shoot, and record a single receiver patch. During recording of one patch, nodes from the previously surveyed patch will be retrieved, recharged, and data downloaded prior to redeployment of the nodes to the next patch. As patches are recorded, receiver lines are moved side to side or end to end to the next patch.

Autonomous recording nodes lack cables but will be tethered together using thin rope for ease of retrieval. This rope and nodes will lay on the seabed surface. A GPS will be attached to the airgun array for the primary vessel positioning. Nodes will be positioned using pingers deployed from the node vessels. Patch geometry may be modified during operations to improve sampling and operational efficiency.

As mentioned above, an acoustical positioning (or pinger) system will be used to position the nodes. A vessel-mounted transceiver calculates the position of the nodes by measuring the range and bearing from the transceiver to a small acoustic transponder fitted to every third node. The transceiver uses sonar to interrogate the transponders, which respond with short pulses that are used in measuring the range and bearing. The system provides a precise location of every node as needed for accurate interpretation of the seismic data. The transceiver to be used is the Sonardyne Scout USBL, while transponders will be the Sonardyne TZ/OBC Type 7815–000–06. Because the transceiver and transponder communicate via sonar, they produce underwater sound levels. The Scout USBL transceiver has a transmission source level of 197 dB re 1 μ Pa at 1 m and operates at frequencies between 35 and 55 kHz. The transponder produces short pulses of 184 to 187 dB re 1 μ Pa at 1 m at frequencies also between 35 and 55 kHz.

BlueCrest Alaska Operations, LLC

BlueCrest proposes to conduct exploratory and delineation drilling operations at two well locations in the Cosmopolitan Unit in Cook Inlet during the 2014 summer drilling season until October 31, 2014. These plans include exploratory gas-only drilling operations at Cosmopolitan State #2, possible delineation well drilling at either Cosmopolitan State #1 or #2, and possible deeper drilling for oil at either well depending on permitting schedules.

Cosmopolitan #1 is located just off Cape Starichkof about 12.9 km (8 mi) north of Anchor Point (59° 53' 12.87" N / -151° 52' 57.71" W; Figure 1) in approximately 24 m (78 ft) of water at 4.8

km (3 mi) from shore. Cosmopolitan #2 is located 11.3 km (7 mi) north of Anchor Point (59° 52' 17.37" N / -151° 51' 55.09" W; Figure 1) in about 16.5 m (54 ft) of water at 3.2 km (2 mi) from shore. BlueCrest's project area also includes two routes between the Port of Homer and Cosmopolitan.

Drill Rig

BlueCrest will conduct its exploratory drilling using the *Endeavour*, an independent leg, cantilevered jack-up drill rig of the *Marathon LeTourneau* Class 116-C that is capable of drilling to 7,620 m (25,000 ft) in water depths from 4.6 to 91 m (15 to 300 ft).

The *Endeavour* will be mobilized from Port Graham, Alaska, to the Cosmopolitan State #2 well site, a distance of about 50 km (31 mi), for drilling operations. Cosmopolitan #2 and #1 are located 1.6 km (1.0 mi) apart, and any subsequent moves between the two sites will be limited. The rig will be towed between locations by ocean-going tugs. Rig moves will be conducted in a manner to minimize any potential risk regarding safety as well as cultural or environmental impact.

Rig Support

Helicopters (twin turbine Bell 212 or equivalent) will be used to transport personnel, groceries, and supplies to and from the rig. The helicopter will be based at the Kenai Airport to support rig crew changes and cargo handling. Fueling will take place at these facilities. No helicopter

refueling will take place on the rig.

Helicopter flights to and from the rig are expected to average two per day. Flight routes will follow a direct route to and from the rig location, and flight heights will be maintained 300 to 450 m (1,000 to 1,500 ft) above ground level to avoid harassment of marine mammals (Richardson *et al.* 1995). The helicopter will be dedicated to the drilling operation and will be available for service 24 hours per day. A replacement helicopter will be available when major maintenance items are scheduled. Supplies (fuel, drilling water, mud materials, cement, casing, and well service equipment) will be staged onshore at the Offshore Systems Dock. Required supplies and equipment will be moved from the staging area by contracted supply vessels and loaded aboard the rig when the rig is established on a drilling location.

Rig equipment will use diesel fuel or electricity. Personnel associated with fuel delivery, transfer, and handling will be knowledgeable of Industry Best Management Practices related to fuel transfer and handling, drum labeling, secondary containment guidelines, and the use of liners/drip trays. The jack-up rig will take on a maximum fuel load prior to operations to reduce fuel transfers during drilling. Commercial tank farms in the Nikiski or Kenai area will supply fuel transported by barge as needed. The rig barge master will be in charge of refueling and fluid transfers between the rig and fuel barge, and subsequent transfers between tanks on the rig.

Drilling Program and Well Operations

BlueCrest proposes to drill at each well to bottom-hole depths of approximately 2,100 to 4,900 m

(7,000 to 16,000 ft). Drilling will take approximately 30 to 75 days per well. Well testing will take another 7 to 15 days per well. When planned operations are completed, the wells will be plugged and abandoned according to Alaska Oil and Gas Conservation Commission regulations.

Blowout Prevention Program and Equipment

All operating procedures on the rig, whether automated or controlled by company or contractor personnel, are specifically designed to prevent a loss of well control. The primary method of well control utilizes the hydrostatic pressure exerted by a column of drilling mud of sufficient density to prevent an undesired flow of formation fluid into the well bore. In the unlikely event that primary control is lost, surface blowout prevention equipment would be used for secondary control. BlueCrest will use a 5,000-pounds-of-pressure-per-square-inch (psi) blowout prevention stack for shallow wells, and a 10,000- or 15,000-psi blowout prevention stack for drilling deeper wells in higher pressure formations known to exist in Cook Inlet.

Drilling Fluids and Cuttings

Drilling wastes include drilling fluids, known as mud, rock cuttings, and formation waters.

Drilling wastes (non-hydrocarbon) will be discharged into the waters of Cook Inlet under the approved Alaska Pollution Discharge Elimination System (APDES) general permit.

Hydrocarbon drilling wastes will be delivered to an onshore permitted location for disposal.

BlueCrest will follow best management practices to ensure that a sufficient inventory of barite and lost circulation materials are maintained on the drilling vessel to minimize the possibility of a

well upset and the likelihood of a release of pollutants to Cook Inlet waters. In accordance with the APDES general permit for discharges of drilling muds and cuttings, BlueCrest will conduct an Environmental Monitoring Study of relevant hydrographic, sediment hydrocarbon, and heavy metal data before, during, and at least 1 year after drilling operations cease.

Non-drilling wastewater will also be discharged into Cook Inlet or delivered to an onshore permitted location for disposal per the approved APDES general permit. Non-drilling wastewater includes deck drainage, sanitary waste, domestic waste, blowout preventer fluid, boiler blowdown, fire control test water, bilge water, non-contact cooling water, and uncontaminated ballast water.

Solid waste (e.g., packaging, domestic trash) will be classified, segregated, and labeled as general, universal, and Resource Conservation and Recovery Act exempt or nonexempt waste. It will be stored in containers at designated accumulation areas until it is packaged and palletized for transport to an approved onshore disposal facility. No hazardous wastes should be generated as a result of this project. However, if any hazardous wastes are generated, they would be temporarily stored in an onboard satellite accumulation area and then transported offsite for disposal at an approved facility.

Dates and Duration of Proposed Activity and Specific Geographical Region

Apache plans to conduct seismic surveys south of Ninilchik from approximately the middle of October 2014 through March or April 2015, during open water periods at slack tides.

SAExploration, Inc.'s seismic surveys in lower Cook Inlet will begin in December 2014 and start in the northern half of their action area to avoid encounters with summering marine mammals near Anchor Point. Completing this work in the lower Cook Inlet is estimated to take 60 to 80 days.

BlueCrest's exploratory drilling at Cosmopolitan State #2 (north of Anchor Point) is expected to begin in November 2014 and conclude in October 2015.

Distribution, Abundance, and Use of Sea Otters in the Area of Specified Activity

Lower Cook Inlet is within the range of the Southcentral stock of the northern sea otter (Figure 2). The estimated abundance of the Southcentral sea otter stock is approximately 18,000 sea otters. Approximately 6,900 otters from this stock are presumed to use Cook Inlet (USFWS 2014). The approximate range of sea otters within the proposed area of specified activity extends from Ninilchik along the eastern side of Cook Inlet to the southeastern edge of the area near Anchor Point. Sea otters are found within all water depths and distances from shore in the proposed project areas in lower Cook Inlet. During Kenai Peninsula and Lower Cook Inlet sea otter aerial surveys, Bodkin et al. (2003) found that sea otters predominantly use the nearshore areas (≥ 40 m; 131.2 ft) due to increased foraging opportunities (Riedman and Estes 1990; Schneider 1976). However, in waters of Cook Inlet and Bristol Bay further from the nearshore area, numerous otters have been observed rafting together transiting through the area (BlueCrest 2013; Schneider 1976). Sea otters do not regularly occur within the upper Cook Inlet; thus, this area is not addressed in these proposed IHAs.

Within their range, sea otters do not use intertidal areas when void of open water and onshore use is extremely limited. The survey activities that will be conducted in the intertidal areas will occur only when those areas contain residual water (i.e., slack tide) and thus the Service has determined that the onshore and intertidal portions of Apache's and SAE's seismic surveys will not likely interact with, or impact, northern sea otters. Therefore, those seismic activities and related operations are not addressed in these proposed IHAs.

Biological Information for the Southcentral stock of northern sea otters can be found in the Service's Stock Assessment Report (USFWS 2014) (<http://www.fws.gov/alaska/fisheries/mmm/seaotters/reports.htm>).

Potential Impacts of the Activities on Sea Otters

Understanding of the effects of sound from oil and gas exploration and drilling activities (i.e., seismic, drilling, pile driving) on sea otters is important for the health of sea otters and the development of parameters by which sea otter takes can be established and monitored. The three proposed actions from Apache, SAE, and BlueCrest have the potential to disturb sea otters, particularly in protected waters in nearshore habitats, which are used for resting, pup rearing, and foraging.

Acoustic noise disturbance from underwater sound sources will be the primary concern for sea otters. For Apache and SAE, the main acoustic source of disturbance will be the airguns that will be deployed from the source vessels. Other underwater sound sources associated with the

seismic surveys that could impact sea otters include the pingers and transponders associated with positioning and locating receiver nodes, and propeller noise from the vessel fleet. For BlueCrest, airborne sound sources include rig towing, noise generated from routine rig activities, and periodic air traffic. Routine boat traffic noise produced by all operators will also generate airborne sound. The Service believes that airborne sound sources will not exceed 160 dB (Level B harassment) and will not affect sea otters (Richardson 1995). Adherence to specified operating conditions for vessels and aircraft will ensure that these airborne sound sources do not take sea otters.

When disturbed by noise, otters may respond behaviorally (e.g., escape response) or physiologically (e.g., increased heart rate, hormonal response; Harms et al. 1997, Tempel and Gutierrez 2003). Either response results in a diversion from one biological activity to another. That diversion may cause stress (Goudie and Jones 2004), and it redirects energy away from fitness-enhancing activities such as feeding and mating (Frid and Dill 2002). Other changes in activities as a result of anthropogenic noise can include: increased alertness; vigilance; agonistic behavior; escape behavior; temporary or permanent abandonment of an area; weakened reflexes; and lowered learning responses (van Polanen Petel et al. 2006). Chronic stress can lead to loss of immune function, decreased body weight, impaired reproductive function, and abnormal thyroid function.

Despite the importance of understanding the effects of sound on sea otters, very few controlled experiments or field observations have been conducted to address this topic. Those studies that have been conducted have concluded that sea otters are generally quite resistant to the effects of

sound, and that change to presence, distribution, or behavior resulting from acoustic stimuli are rare (Ghoul et al. 2012a and b; Reichmuth and Ghoul 2012; Riedman 1984). Additionally, when sea otters have displayed behavioral disturbance to acoustic stimuli, they quickly become habituated and resume normal activity (Ghoul et al. 2012b).

Disturbance from Vessel Traffic and General Operations

Sea otters generally show a high degree of tolerance and habituation to shoreline activities and vessel traffic (Gill, USFWS, Marine Mammals Management, pers. obs.), but disturbance may cause animals to disperse from the local area. Populations of sea otters in Alaska have been known to avoid areas with heavy boat traffic but return to those same areas during seasons with less traffic (Garshelis and Garshelis 1984). Sea otters in Alaska have shown signs of disturbance (escape behaviors) in response to the presence and approach of survey vessels, including: diving and/or actively swimming away from a boat; hauled-out otters entering the water; and groups of otters disbanding and swimming in multiple different directions (Udevitz et al. 1995). However, sea otters off the California coast showed only mild interest in boats passing within hundreds of meters, and sea otters in California appear to have habituated to boat traffic (Riedman 1983; Curland 1997). Their behavior is suggestive of a dynamic response to disturbance, abandoning areas when disturbed persistently and returning when the disturbance ceased. From the above research it is likely that some degree of disturbance from vessel traffic associated with the proposed actions will occur. Sea otters reacting to vessels they encounter may consume energy and divert time and attention from biologically important behaviors, such as feeding. However, these disturbances are expected to be short term in duration, and this potential short-term

displacement is not anticipated to affect the overall fitness of any individual animal. We also anticipate that individual otters will habituate to the presence of project vessels and associated noise. Boat traffic, commercial and recreational, is constant in Cook Inlet. Some sea otters in the area of activity are likely to become habituated to vessel traffic and noise caused by vessels due to the existing continual traffic in the area. The additional vessel activity that will occur related to these three projects is not expected to substantially increase vessel noise or activity in the action area above that which is already occurring.

Sea otter collisions with vessels associated with the proposed project are unlikely. Tugs and barges are slow moving and pose little risk of colliding with otters. Collisions between fast-moving vessels do occur but are infrequent and are usually associated with impaired animals (Gill, USFWS, Marine Mammals Management, pers. comm.). No fast boat use is proposed, and it is unlikely that housing and crew transfer vessels will impact otters. Vessels proposed for use to transfer housing and crew can produce noises exceeding 190 or 180 dB re 1 μ Pa when traveling at higher speeds. However, the influence of this sound is limited to a distance of 2 to 4 m (6.6 to 13.1 ft) from the vessel. Adherence to operating conditions will ensure that these vessels do not take sea otters.

Disturbance from Noise

Effects of noise on marine mammals are highly variable and can be categorized as: tolerance; masking of natural sounds; behavioral disturbance; temporary or permanent hearing impairment; and non-auditory effects, such as female-pup separations (Richardson *et al.* 1995). Whether a

specific noise source will cause harm and/or disturbance to a sea otter depends on several factors, including the distance between the animal and the sound source, the sound intensity, background noise levels, the noise frequency (cycles per second; Hz (hertz) or kHz), duration, if the noise is pulsed or continuous, and whether the noise source originates in the aquatic or terrestrial environment. For otters, behavioral reactions may be shown as: changing durations of surfacing and dives; changing direction and/or speed; reduced/increased vocal activities; changing/cessation of socializing or feeding; visible startle response; avoidance of areas where noise sources are located; and/or flight response (e.g., otters flushing into water from haulouts). The consequences of behavioral modification have the potential to be biologically significant if the change affects growth, survival, and reproduction.

Information regarding the northern sea otter's hearing abilities is limited; however, the closely related southern sea otter (*Enhydra lutris nereis*) has some information showing this subspecies' range of hearing. Reichmuth and Ghoul (2012) tested the aerial (from airborne sound sources) hearing capabilities of one male southern sea otter believed to have typical hearing. The study revealed an upper frequency hearing limit extending to at least 32 kHz and a low frequency limit below 0.125 kHz. These results are generally consistent with comparable data for other carnivores, including terrestrial mustelids. This range is also similar to that of harbor seals (*Phoca vitulina*; Pinnipedia) (0.075 to 30 kHz) (Kastak and Schusterman 1998, Hemilä *et al.* 2006, Southall *et al.* 2007), which suggests pinnipeds may be a good proxy for sea otters. Additionally, sea otters and harbor seals both exhibit amphibious hearing and spend a considerable amount of time above water, where they are not disturbed by airborne sound sources; southern sea otters spend about 80 percent of their time at the sea surface, whereas

harbor seals may spend up to 60 percent of their time hauled out of the water (Frost *et al.* 2001).

Riedman (1983) examined changes in the behavior, density, and distribution of southern sea otters at Soberanes Point, California, that were exposed to recorded noises associated with oil and gas activity. The underwater sound sources were played at a level of 110 dB and a frequency range of 50–20,000 Hz and included production platform activity, drillship, helicopter, and semi-submersible sounds. Riedman (1983) also observed the sea otters during seismic airgun shots fired at decreasing distances from the nearshore environment (50, 20, 8, 3.8, 3, 1, and 0.5 nautical miles) at a firing rate of 4 shots per minute and a maximum air volume of 4,070 cubic inches. Riedman (1983) observed no changes in the presence, density, or behavior of sea otters as a result of underwater sounds from recordings or airguns, even at the closest distance of 0.5 nm (<1 km). Otters did, however, display slight reactions to airborne engine noise. Riedman (1983) concluded that seismic activities had no measurable effect on sea otter behavior. The experiment was repeated the following year (Riedman 1984) with the same results.

In another controlled study using prerecorded sounds, Davis *et al.* (1988) exposed both northern sea otters in Simpson Bay, Alaska, and southern sea otters in Morro Bay, California, to a variety of aerial (airborne) and underwater sounds, including a warble tone, sea otter pup calls, killer whale calls, airhorns, and an underwater acoustic harassment system designed to drive marine mammals away from crude oil spills. The sounds were projected at a variety of frequencies, decibel levels, and intervals. The authors noted that certain acoustic stimuli could cause a startle response and result in dispersal. However, the disturbance effects were limited in range (no responses were observed for otters approximately 100–200 m (328–656 ft) from the source of the

stimuli), and habituation to the stimuli was generally very quick (within hours or, at most, 3–4 days).

The National Marine Fisheries Service (NMFS) has developed noise thresholds used to measure injury for pinnipeds (i.e., on Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS)). Sea otter specific thresholds have not been determined; however, because of their biological similarities, we assume that noise thresholds developed by NMFS for injury for pinnipeds will be a surrogate for sea otter impacts as well. When PTS occurs, there is physical damage to the sound receptors in the ear. Severe cases can result in total or partial deafness. In other cases, the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter 1985).

The noise thresholds established by NMFS for preventing injury to pinnipeds were developed as precautionary estimates of exposures below which physical injury would not occur. There is no empirical evidence that exposure to pulses of airgun sound can cause PTS in any marine mammal, even with large arrays of airguns (Southall et al. 2007). However, given the possibility that mammals close to an airgun array might incur at least mild TTS in the absence of appropriate mitigation measures, researchers have speculated about the possibility that some individuals occurring very close to airguns might incur PTS (e.g., Richardson et al. 1995).

Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing TTS onset might elicit PTS. By means of preventing the onset of TTS, it is highly unlikely that marine

mammals could receive sounds strong enough (and over a sufficient duration) to cause permanent hearing impairment. These thresholds estimate that take in the form of PTS may occur when pinnipeds are exposed to sound pressure levels above 190 dB (Level A take; injury). NMFS thresholds indicate that take in the form of TTS can occur at levels above 160 dB (Level B; harassment) (all decibel (dB) levels given herein are re: 1 μ Pa RMS). Until specific sea otter thresholds are developed for both Level A and Level B harassment and injury, the use of NMFS thresholds for pinnipeds as a proxy for otters remains the best available information. NMFS's thresholds are further described and justified in NOAA (2005), NOAA (2006), NOAA (2008), and Southall et al. (2007) for our analysis.

In conclusion, using information available for other marine mammals as a surrogate, and taking into consideration what is known about sea otters, the Service has set the received sound level under water of 160 dB re 1 μ Pa (rms) as a threshold for Level B take by disturbance for sea otters for this proposed IHA (Ghoul and Reichmuth 2012a and b, McShane et al. 1995, NOAA 2005, Riedman 1983, Richardson et al. 1995). Exposure to unmitigated noise levels in the water greater than 160 dB re 1 μ Pa (rms) will be considered by the Service as potentially injurious Level A take; and levels above 190 dB re 1 μ Pa (rms) are defined as the Level A take threshold for sea otters. Level A take will not be authorized and will be avoided through mitigation measures.

Seismic Operations

Sound reception studies by Ghoul and Reichmuth (2012b) determined that sea otters effectively

hear between 125 Hz and 32 kHz, or above the range where most seismic energy is produced. Thus, sea otters appear to have limited hearing of seismic airguns (especially compared to humans with effective hearing down to 20 Hz). To the extent that sea otters can detect seismic noise, the potential effects of Apache's and SAE's proposed activities are described below.

Apache's seismic survey has the potential to affect sea otters with sound generated by the seismic airguns, active acoustic sources for surveys (i.e., pingers), and vessel transit. The seismic airguns used by Apache are two 2,400-cubic-inch airgun arrays. The acoustic source level of the 2,400-cubic-inch airgun arrays was predicted using the JASCO Applied Science air array source model. Two general survey environment scenarios were considered for the modeling study: a nearshore (from shore out to 18 km (11 mi) offshore) and a channel survey scenario (more than 18 km (11 mi) from shore). Results from this study can be found in Apache's EA. Mitigation measures are in place to reduce the acoustic impacts to sea otters. Vessel-based Protected Species Observers will monitor sea otters during all daylight airgun operations. To prevent Level A take of sea otters, airgun activity will shut down if a sea otter approaches within 500 m (1,640 ft) from the source vessel.

The seismic airguns that will be used during SAE's Cook Inlet operation have the potential to acoustically injure marine mammals at close proximity. As no sound levels have been effectively measured to establish the threshold where injury caused by an acoustic source exists, the 190-dB criterion for seals applies most closely to sea otters given their more similar natural history than compared to cetaceans. To avoid exposing marine mammals to these received noise levels, safety zones will be established based on the zones of impact (the area ensonified by a

specific sound level) for the 440- (221.1 dB source), 880- (226.86 dB source) and 1,760- (236.55 dB source) cubic-inch airgun arrays. Based on the transmission losses empirically measured for similar arrays by Collins et al. (2007) in Cook Inlet ($18.4 \log(R) + 0.00188R$), the distances to the 190- and 180-dB isopleths (safety zone radii) are described in Table 2. Qualified protected species observers will be deployed aboard the seismic vessels to monitor the safety zones (see SAE's EA for a more detailed description) and alert operations to shut down at the approach of a marine mammal to these safety zones, (including a sea otter to the 190-dB safety zone 315-m radius (1,033 ft)).

Warner and McCrodan (2011) modeled the distances to the 190- and 180-dB isopleths from the same vessels to be used in this project while they were towing a 2,400-cubic-inch array in Cook Inlet. The maximum safety radii were 360 m (1,181 ft; 190 dB) and 1,070 m (3,510 ft; 180 dB), which correspond well to the numbers in Table 2 given that the 2,400-cubic-inch array is larger than the 1,760-cubic-inch array. Sound source verification of the 1,760-cubic-inch array will be conducted soon after operations begin, and the safety radii adjusted as needed.

Table 2. Safety zone radii for pinnipeds (190 dB) and cetaceans (180 dB) for each airgun array.

Array (cubic inch)	Source Level (dB)	190 dB radius (m)	180 dB radius (m)
440	221.1	49	165
880	226.86	99	327
1,760	236.55	315	948

While the pingers and transponders to be used by SAE will be used to relocate nodes, their generated source sound levels (185 to 193 dB) exceed Level A criteria, but only at a very limited

radius distance of 0 to 6 m (0 to 20 ft). Marine mammal observers and operators will, however, ensure that no marine mammals are in the immediate vicinity before deploying active pingers and transponders.

Both the transceiver and the transponders for Apache's and SAE's projects produce noise levels just above the most sensitive hearing range of sea otters (0.125 to 32 kHz) (Ghoul and Reichmuth 2012a and b). Further, given the low acoustical output of the transceiver and the transponders, the range of acoustical harassment to marine mammals is measured to be approximately 100 m (328 ft), which is significantly less than the output from the airgun arrays. In addition, the noise produced is not loud enough to reach injury levels in sea otters beyond 9 m (30 ft). Sea otters are likely to respond to transceiver and transponder transmission similar to airgun pulses, but only when underwater and very close (a few meters away) to the sources, which is very unlikely to occur given the boat activity involved.

Acoustic noise can also result from explosive charges used for seismic activity. Marine mammals close to underwater detonations of high explosives can be killed or severely injured, where the auditory organs are especially susceptible to injury (Ketten *et al.* 1993, Ketten 1995). No underwater detonations are expected to occur in the action area, although Apache plans to use explosives in the nearshore intertidal area during slack tides. No sea otters are expected to occur in this intertidal area, and the Service does not anticipate sea otters to interact with this portion of Apache's activity.

Seismic operations could also cause behavioral effects on sea otters. For example, severe

disturbance from seismic noise or activities could cause female-pup separations, male territory abandonment, male territory shifts and conflicts between territories, breakup of rafts of nonbreeding males, and or movement by individual otters out of nearshore areas into deeper water. These types of displacement events, if they occurred, could have repercussions on breeding success and/or survival due to increased risk of predation or other adverse conditions. However, because sea otters spend relatively large amounts of time above the water surface compared to other marine mammals, sea otters' potential exposure to the underwater acoustic stimuli, such as those associated with seismic surveys (Greene and Richardson 1988), may be lower than that of other marine mammal species (Richardson et al. 2011). As previously stated, studies have not shown these kinds of dramatic responses when otters were exposed to seismic operations, and, therefore, we have no reason to believe that otters will exhibit any of these reactions during these activities.

The Service has never documented a stranding related to sound exposure for sea otters in Cook Inlet (Gill, USFWS Marine Mammals Management, pers. comm.). More directly, no strandings or sea otters in distress were observed during the 2D test survey conducted by Apache in March 2011 or reported by Cook Inlet inhabitants. To date, there is no evidence that serious injury, death, or stranding of sea otters can occur from exposure to airgun pulses, even in the case of large airgun arrays. As a result, the Service does not expect any sea otters to incur serious injury (Level A harassment) or mortality in Cook Inlet or strand as a result of the proposed seismic survey.

Drilling Operations

For BlueCrest's drilling operation, two project components have the potential to disturb sea otters: driving the conductor pipe at each well prior to drilling; and vertical seismic profiling (VSP) operations that may occur at the completion of each well drilling.

As described in BlueCrest's application, the conductor pipe driving and VSP are impulsive noise activities. Here the Level B disturbance exposure to sound levels greater than 160 dB re 1 μ Pa-m (rms) applies, and "take" is addressed relative to noise levels exceeding 160 dB, above which disturbance can occur until 190 dB, after which potential injury can occur.

Conductor Pipe Driving

A conductor pipe is a relatively short, large-diameter pipe driven into the sediment prior to the drilling of oil wells. This section of tubing serves to support the initial sedimentary part of the well, preventing the looser surface layer from collapsing and obstructing the wellbore. The pipe also facilitates the return of cuttings from the drill head. Conductor pipes are usually installed using drilling, pile driving, or a combination of these techniques. In offshore wells, the conductor pipe is also used as a foundation for the wellhead. BlueCrest proposes to drive approximately 90 m (300 ft) of 76.2-cm (30-inch) conductor pipe at Cosmopolitan #2 (and any associated delineation wells) prior to drilling using a Delmar D62-22 impact hammer. This hammer has impact weight of 6,200 kg (13,640 pounds) and reaches maximum impact energy of 224 kilonewton-m (165,215 foot-pounds) at a drop height of 3.6 m (12 ft).

Blackwell (2005) measured the noise produced by a Delmar D62-22 driving 91.4-cm (36-inch) steel pipe in Cook Inlet and found sound pressure levels to exceed 190 dB re 1 μ Pa-m (rms) at about 60 m (200 ft), 180 dB re 1 μ Pa-m (rms) at about 250 m (820 ft), and 160 dB re 1 μ Pa-m (rms) at just less than 1.9 km (1.2 mi). Each conductor pipe driving event is expected to last 1 to 3 days, although actual noise generation (pounding) would occur only intermittently during this period. It is anticipated that sea otters will move away from any sound disturbance caused by the pipe driving or become habituated by it.

Vertical Seismic Profiling (VSP)

Once a well is drilled, accurate followup seismic data can be collected by placing a receiver at known depths in the borehole and shooting a seismic airgun at the surface near the borehole. This gathered data provides not only high-resolution images of the geological layers penetrated by the borehole, called vertical seismic profiling (VSP), but it can also be used to accurately correlate (or correct) the original surface seismic data.

BlueCrest intends to conduct VSP operations at the end of drilling each well using an array of airguns with total volumes of between 9.83 and 14.42 liters (600 and 880 cubic inches). Each VSP operation is expected to last less than 1 or 2 days. Assuming a 1-m source level of 227 dB re 1 μ Pa (based on manufacturer's specifications) for a 14.42-liter (880-cubic-inch) array and using Collins et al.'s (2007) transmission loss model for the Cook Inlet ($18.4 \text{ Log}(R) - 0.00188R$), the 190-dB radius (Level A take threshold for pinnipeds and surrogate for sea otters) from source was estimated at 100 m (330 ft), and the 160-dB radius (Level B disturbance take

threshold for all sea otters) at 2.46 km (1.53 mi). These were the initial injury and safety zones established for monitoring during a VSP operation conducted by Buccaneer at Cosmopolitan State #1 during July 2013. Illingworth and Rodkin (2013) measured the underwater noise levels associated with the July 2013 VSP operation using an 11.8-liter (720-cubic-inch) array and found the noise exceeding 160 dB re 1 μ Pa (rms) extended out 2.47 km (1.56 mi) or virtually identical to the modeled distance. The measured radius to the 190-dB level was 75 m (246 ft) and to the 180-dB level was 240 m (787 ft). The best fit model for the empirical data was $227 - 19.75 \log(R) - 0.0R$ (Illingworth and Rodkin 2013).

Exploratory Drilling and Standard Operation

The jack-up drilling rig, *Endeavour*, is not expected to impact otters. Lattice-legged jack-up drill rigs are relatively quiet because the lattice legs limit transfer of noise generated from the drilling table to the water (Richardson et al. 1995, Spence et al. 2007). Further, the drilling platform and other noise-generating equipment are located above the ocean surface, so there is very little surface contact with the water compared to drill ships and semi-submersible drill rigs. For example, the *Spartan 151*, the only other jack-up drilling rig operating in the Cook Inlet, was hydro-acoustically measured by Marine Acoustics, Inc. (2011) while operating in 2011. The survey results showed that continuous noise levels exceeding 120 dB re 1 μ Pa extended out only 50 m (164 ft), and that this noise was largely associated with the diesel engines used as power generators. The *Endeavour* was hydro-acoustically tested during drilling activities by Illingworth and Rodkin (2013) in May 2013, while the rig was operating at Cosmopolitan State #1. The results from the sound source verification indicated that noise generated from drilling or

generators were below ambient noise. The generators used on the *Endeavour* are mounted on pedestals specifically to reduce noise transfer through the infrastructure, and they are enclosed in an insulated engine room. In addition, the submersed deep-well pumps that cool the generators and charge the fire-suppression system also generate noise levels exceeding 120 dB re 1 μ Pa out a distance of approximately 300 m (984 ft). However, the Service does not anticipate that this level of noise will impact sea otters. Thus, neither actual drilling operations nor running generators on the *Endeavour* drill rig generates underwater noise levels exceeding 120 dB re 1 μ Pa.

For this IHA analysis, acoustical injury to sea otters can occur if received noise levels exceed 190 dB re 1 μ Pa (rms). This is classified as a Level A take (injury), which is not authorized by IHAs. The towing, drilling, and pump operations to be used during BlueCrest's program do not have the potential to acoustically injure marine mammals (see Section 6 of the BlueCrest application). Therefore, no shutdown safety zones will be established for these activities. However, the conductor pipe driving and VSP operations do generate impulsive noises exceeding 190 dB re 1 μ Pa (rms). Based on the estimated distances to the 190-dB isopleth addressed above, a 60-m (200-foot) shutdown safety zone will be established and monitored during conductor pipe driving (at least until the noise levels are empirically verified), while a 75-m (246-ft) shutdown safety zone will be monitored during VSP operations. Sea otters may be disturbed at noise levels between 160 dB to 190 dB, where disturbance can occur (Level B harassment) out to approximately 0.75 km (2.5 mi). If these takes occur, they are likely to result in nothing more than short-term changes in behavior.

Estimated Take of Sea Otters

As described earlier, the Service anticipates that incidental take will occur during Cook Inlet oil and gas activities conducted by Apache, SAE, and BlueCrest. In the sections below, we estimate take by harassment of the numbers of sea otters from the Southcentral stock that are likely to be affected during the proposed activities.

Sound levels

As noted earlier, there is a lack of information available regarding the impacts of noise disturbance on sea otters. However, by using information available for other marine mammals as a surrogate, and taking into consideration what is known about sea otters, the Service has set the received sound level under water of 160 dB re 1 μ Pa (rms) as a threshold for Level B take by disturbance for sea otters for this proposed IHA (Ghoul and Reichmuth 2012a and b, McShane et al. 1995, NOAA 2005, Riedman 1983, Richardson et al. 1995). Exposure to unmitigated noise levels in the water greater than 190 dB re 1 μ Pa (rms) will be considered by the Service as potentially injurious Level A take threshold for sea otters. Level A take will not be authorized and will be avoided through mitigation measures, such as ramp-down or shut-down procedures when sea otters are observed in a designated mitigation zone.

Population size estimate

The current estimate for the Southcentral Alaska stock of northern sea otters is 18,297 (USFWS

2014). Aerial surveys in Kachemak Bay in 2002, 2007, and 2008, indicated that the sea otter population is increasing. The rate of increase for the Cook Inlet portion of the population is unknown because surveys have not been repeated; however, it is assumed to be similar to that in Kachemak Bay. The estimated sea otter population for Cook Inlet was, therefore, adjusted to allow for population growth between 2002 and 2014 at the same rate as Kachemak Bay. This rate was calculated by estimating least squares linear and exponential trends for the 2002, 2007, 2008, and 2012 population estimates. The linear model was selected based on model fit ($R^2_{\text{linear}} 0.98$ vs. $R^2_{\text{exp}} 0.92$). This model predicted an annual population growth of 495 animals and an estimated 2014 population size of 6,904 animals for Cook Inlet.

Density

The density of sea otters has been reported as either otters per area or otters per length of linear coastline. Because sea otters primarily forage nearshore in shallow water and rely on coastal habitat, we calculated density per linear kilometer of coastline. The length of the 2002 USGS survey coastline from which the Cook Inlet population was estimated was 539.98 km. Using the estimated 2014 population size and applying that to the length of coastline; the Service calculated a density of 12.79 (95 percent CI 6.5–19.08) otters per kilometer of coastline ($6,904/539.98 = 12.79$). For the offshore activities proposed by Blue Crest, we used observational data from 2013 to estimate the number of sea otters per day within the area that could be observed from the drill rig. The estimate was based on the number of sea otters observed from the *Endeavor* drilling rig during Buccaneer gas exploration activities in 2013 by marine mammal monitors in the same area and during the same proposed timeframe (BlueCrest

2013).

Estimation of Take for Seismic Programs

Incidental take of otters is estimated as the number of otters that may be exposed to Level B harassment during the entire duration of the project, as it has been described. No lethal take is expected, and all take will be by harassment; therefore, individual animals may be taken multiple times over the course of the project. The total estimated number of takes is the number of otters multiplied by the number of times each animal could potentially be taken. It does not account for animals that may remove themselves from the impact area and thus avoid repeated exposures. It also does not subtract animals that are harassed early during the project but then become habituated to seismic sound at levels below injury thresholds. The Service has no information on which to base such adjustments to the calculation of total number of takes. However, larger estimates of the total number of takes are expected for projects with a larger impact area or longer duration. For these reasons, the estimated total number of takes should be considered as a useful metric for comparison rather than a precise measure of the project's overall potential for impact. Our determination of small numbers is based on the number of sea otters taken and not the number of times a sea otter may be taken.

Method

The northern end of the seismic project areas extends beyond the range of the sea otter. To determine the most northern range for sea otters, all observations in middle and upper Cook Inlet

proper (as defined by areas north of Point Pogibshi and east of Chinitna Point) reported during sea otter surveys or as incidental sightings during Steller's eider (Larned 2004, 2006) and beluga whale surveys (Rugh et al. 2006, Goetz et al. 2012) were compiled. To reduce the influence of extralimital sightings, a minimum convex polygon containing 95 percent of sea otter sightings was created, excluding 5 percent of sightings with the greatest distance to the centroid. A buffer area was expanded outside the project areas to show the farthest distances at which the two seismic surveys could ensonify areas in the range of sea otters at the 160-dB level. The buffer areas differed for Apache and SAE based on the size of their gun arrays. Apache proposed to use a 2,400-cubic-inch array, while SAE proposed to use a 1,760-cubic-inch array. The estimated buffer for Apache's project area was 9.5 km (5.9 mi), while SAE's buffer area was 4.75 km (2.9 mi).

Apache

The length of coastline that intersected the Apache project area and the corresponding buffer were measured to estimate the length of coastline along which otters are expected to occur and may be affected by the seismic surveys. Applying the estimated density of 12.79 otters per km of coastline to the length of the coastline (27.5 km; 17.1 mi) yields a final estimate of approximately 351 otters that could be taken ($12.79 \times 27.5 = 351$; estimated 95 percent CI from 178 to 524 otters).

In addition, we estimated the total number of incidental takes of otters based on Apache's description of survey time that would be spent in each quadrant of the survey area. We

calculated that approximately 19.25 percent of these surveys would occur within the probable range of sea otters in Cook Inlet and within 9.5 km (5.9 mi) of the coast, where sea otters are most likely to be found and could be affected by the seismic surveys. The estimated total time spent in these areas was approximately 3.27 survey days. Allowing one take per otter, per survey day, yields 1,150 takes ($3.27 \times 351 = 1,150$; estimated 95 percent confidence interval [CI] 584 -1,715).

SAExploration, Inc.

The length of coastline that intersected the SAE project area, but did not overlap with Apache seismic surveys, was buffered 4.75 km (2.95 mi) based on farthest distances at which seismic surveys are predicted to ensonify an area using a model developed for Cook Inlet by Collins et al. (2007). SAE's estimated total length of Cook Inlet coastline where sea otters may be affected by the seismic surveys was 55.72 km (34.6 mi). Applying the estimated density of 12.79 otters per km of coastline to the length of the coastline for SAE's longer length of coastline than Apache's yields an estimated 713 otters that could possibly be taken ($55.72 \times 12.79 = 712.5$; estimated 95 percent CI from 362 to 1,064 otters).

We further estimated the total number of takes for the duration of SAE's project based on SAE's description of surveys. For this project we calculated approximately 31.6 percent of SAE's surveys would occur in the sea otter range in Cook Inlet and within 4.75 km (2.95 mi) of the coast. We estimated the total time the seismic project would spend in the calculated otter range was approximately 10.1 survey days. Due to the slow rate of vessel speed and the planned

layout of survey transects, the length of the coastline affected each day would be less than the total length of coastline within the SAE project area. To calculate the maximum number of otters that could be taken per day, we calculated the maximum length of impacted shoreline per day, times density of otters per linear km of shoreline. The maximum shoreline impact in a day would occur from a 12-km (7.46-mi) transect parallel to shore. With buffers to allow for sound attenuation, a total of 21.5 km (13.4 mi) maximum could be affected each day ($4.75 + 12 + 4.75 = 21.5$ km). An adjustment was made for the length of the coastline ensonified each day by SAE because, unlike the Apache seismic project, the SAE survey area is large enough that seismic ensonification would not affect the entire section of coastline within the SAE project area and would ensonify only a portion of the coastline at one time. For SAE, allowing one take per otter per survey day and an estimated density of 12.76 otters per km, the maximum estimated daily take of otters is 275 ($21.5 \times 12.79 = 275$). We estimated that the total number of takes after 10.1 survey days would be 2,778 takes ($10.1 \times 275 = 2,778$; estimated 95 percent CI 1,412–4,145) would occur.

Estimation of Take for the Drilling Program

BlueCrest

The Service determined that the BlueCrest activities most likely to result in the take of sea otters, as defined under the MMPA, are conductor pipe driving (CPD) and vertical seismic profiling (VSP). These activities will generate noise levels in the water that may cause short-term, temporary, nonlethal, but biologically significant changes in behavior to sea otters that the

Service considers to be Level B take by disturbance under the MMPA. Other proposed activities, such as rig towing, noise generated from routine rig activities, routine boat traffic, and periodic air traffic were considered to have a limited potential for disturbance leading to Level B take. Adherence to specified operating conditions will ensure that take does not occur. The Service made these determinations, in part, based on information provided in the application materials provided by BlueCrest, including the application's Marine Mammal Monitoring and Mitigation Plan.

The proposed BlueCrest activities, previously discussed in detail, will primarily occur in a limited area around the *Endeavor* jack-up drilling rig at the Cosmopolitan #1 site. The Service used the number of sea otters observed from the *Endeavor* drilling rig during Buccaneer gas exploration activities in 2013 in the same area and during the same proposed timeframe as a basis for estimating the maximum number of otters likely to be in the area per day (BlueCrest 2013).

In 2013, an area of 210 m² (2260 ft²) on the surface of the water around the deep water pump was intensively observed for the presence of sea otters (BlueCrest 2013). Given the high probability of detection of sea otters in such a small area in direct proximity to the rig, the Service used these observations as the basis for estimating the presence of sea otters in the area for the 2014 operations. From May to August (103 observation days), an average of 2.54 sea otters were observed in the 210-m² (2,260-ft²) area around the deepwater pump.

The Service estimated the number of sea otters per day in a Zone of Impact (ZOI) by multiplying the number of sea otters observed per day in the deepwater pump observation area by the relative size of the 160 dB re 1 μ Pa (rms) ZOI of the CPD and VSP. For example, the VSP ZOI is 19.2 km² or 91.42 times larger than the deepwater pump observation area: The otters per day is $91.42 \times 2.54 = 232.23$. We multiplied the estimated number of sea otters per day by the number of days the activity is proposed to occur and then, because the otters are rafting through rather than foraging, we adjusted the number of otters potentially exposed to these noise levels to account for the time sea otters spend on the surface, which is approximately 70 percent and based on observational surveys (Bodkin et al 2004, Estes et al 1986, Riedman and Estes 1990, Walker et al. 2008, Yeates et al. 2007). The estimate of potential Level A takes of sea otters is zero.

Conductor Pipe Driving

BlueCrest will use a Delmar D62–22 diesel impact hammer to drive the 76.2-centimeter (30-inch) conductor pipe that was acoustically measured earlier in Cook Inlet (Blackwell 2005). These measurements found that noise in the water of approximately 190 dB re 1 μ Pa extended to about 60 meters (200 feet) from the source, and noise in the water of approximately 180 dB re 1 μ Pa extended to about 250 meters (820 feet) from the source. Noise in the water of approximately 160 dB re 1 μ Pa extended to just less than 1.9 kilometers (1.2 miles). Based on this, the associated Zone of Impact (ZOI) (area ensonified by noise >160 dB re 1 μ Pa) is 11.3 square kilometers (4.4 square miles) for the CPD estimate.

Vertical Seismic Profiling

Noise levels during Buccaneer VSP operations at the Cosmopolitan #1 site were measured in July 2013 (Illingworth and Rodkin 2013). Measurements indicated that the 11.8-liter (720-cubic-inch) airgun array used during the operation produced noise levels exceeding 160 dB re 1 μ Pa out to a distance of approximately 2,470 meters (8,100 feet). Based on these results, the associated ZOI for this VSP estimate is 19.2 square kilometers (7.4 square miles).

Table 3. Estimated number of Level B takes of sea otters from the Southcentral stock by proposed BlueCrest activities.

BlueCrest Activity	Activity Days	Activity ZOI (Km ²)	Estimated Sea Otters per Day	Estimated Sea Otters Exposed	Sea Otter Surface Time Adjustment (70%)
CPD	3	11.3	136.68	410	123
VSP	3	19.2	232.23	697	209
Total	6	30.5	368.91	1107	332

This method for estimating take differs from that used for activities proposed by Apache and SAE. Due to the relatively stationary nature of the BlueCrest activities, as well as the distance from shore, the Service determined that utilizing an estimated density of sea otters based on linear coastline, or based on density of otters in the overall area, did not provide a reasonable estimate of potential takes for the BlueCrest project. Both of those methods provided what the Service considered to be unreasonably low estimates of take. The method the Service adopted for this proposed IHA is most likely an overestimate of take.

In conclusion, for the two seismic operations occurring in Cook Inlet, Apache is estimated to have approximately 1,150 takes of 351 otters, while SAE is estimated to have approximately

2,778 takes of 713 otters; there may be some overlap of impact areas. In addition, Level B take from the BlueCrest activities is estimated to be 332. The total number of otters affected is likely to be $351 + 713 + 332 = 1,396$ or less. The Service believes all anticipated takes would be nonlethal harassment involving short-term, temporary changes in behavior (Level B harassment). The Service considers 1,396 sea otters, approximately 8 percent of the 18,297 sea otters estimated to occur in the Southcentral Alaska stock (USFWS 2014), to be a small number. See Table 4 for summary of takes.

Table 4. Summary of estimated takes.

Applicants	Number of takes (Level B harassment)	Number of sea otters taken
Apache	1,150	351
BlueCrest	2,778	713
SAE	332	332
TOTAL	4,260	1,396

Potential Effects on Sea Otter Habitat

As described in greater detail previously, the oil and gas exploration activities associated with these proposed IHAs are two seismic surveys and one drilling operation. The primary potential impacts to sea otters, and other marine species, are associated with high-energy impulsive sound levels produced by these activities. However, other potential impacts are also possible to the surrounding habitat from physical disturbance, discharges, or an oil spill.

Since sea otters typically inhabit nearshore marine areas, shoreline length is a readily available metric that can be used to quantify sea otter habitat. The total length of shoreline within the range of the Southcentral Alaska stock of northern sea otters is approximately 2,575 km (1,600 mi), of which 540 km (335.5 mi) are located within Cook Inlet. Of that, the total length of

shoreline for the proposed activities is approximately 84 km (52.2 mi), which is a small percentage of the total shoreline habitat available to the Southcentral sea otter stock.

Potential Impacts to Prey

In addition to the disturbances outlined above to sea otter habitat from noise, these activities could affect sea otter habitat in the form of impacts to prey species. The primary prey species for sea otters are sea urchins, abalone, clams, mussels, crabs, and squid (Tinker and Estes 1999). When preferential prey are scarce, otters will also eat kelp crabs, clams, turban snails, octopuses, barnacles, sea stars, scallops, rock oysters, fat innkeeper worms, and chitons (Riedman and Estes 1990). Thus, the nearshore habitats where sea otters forage and support these species are of utmost importance to Cook Inlet sea otters.

From Seismic Surveys

Little research has been conducted on the effects of seismic operations on invertebrates (Normandeau Associates, Inc. 2012). Christian et al. (2003) concluded that there were no obvious effects from seismic signals on crab behavior and no significant effects on the health of adult crabs. Pearson et al. (1994) had previously found no effects of seismic signals upon crab larvae for exposures as close as 1 m (3.3 ft) from the array, or for mean sound pressure as high as 231 dB re 1 μ Pa. Squid and other invertebrate species have complex statocysts (Nixon and Young 2003) that resemble the otolith organs of fish that may allow them to detect sounds (Budelmann 1992). Normandeau Associates, Inc. (2012) concluded that invertebrates are

sensitive to local water movements and to low-frequency particle accelerations generated by sources in their close vicinity.

From Drill Rig Presence

The potential direct habitat impact by the BlueCrest drilling operation is limited to the actual drill-rig footprint defined as the area occupied and enclosed by the drill-rig legs. The jack-up rig will temporarily disturb up to two offshore locations in upper Cook Inlet, where the wells are proposed to be drilled. Bottom disturbance would occur in the area where the three legs of the rig would be set down and where the actual well would be drilled. The jack-up drill rig footprint would occupy three steel piles at 14 m (46 ft) diameter. The well casing would be a 76-cm (30-in) diameter pipe extending from the seafloor to the rig floor. The casing would be in place only during drilling activities at each potential well location. The total area of disturbance was calculated by BlueCrest as 0.54 acres. The collective 2-acre footprint of the wells represents a very small fraction of the entire Cook Inlet. Potential damage to the Cook Inlet benthic community will be limited to the actual surface area of the three spud cans (1,585 square ft each or 4,755 square ft total) that form the “foot” of each leg. Given the high tidal energy at the well site locations, drilling footprints are not expected to support benthic communities equivalent to shallow lower energy sites found in nearshore waters. The presence of the drill rig is not expected to result in any direct loss of sea otter habitat.

From Drilling Discharges

The drill rig will operate under an APDES general permit for wastewater discharges. This permit authorizes discharges from oil and gas extraction facilities engaged in exploration under the Offshore and Coastal Subcategories of the Oil and Gas Extraction Point Source Category (40 CFR part 435). Twelve effluents are authorized for discharge into Cook Inlet once discharge limits set by the Alaska Department of Environmental Conservation have been met. The authorized discharges include drilling fluids and drill cuttings, deck drainage, sanitary waste, domestic waste, blowout preventer fluid, boiler blowdown, fire control system test water, uncontaminated ballast water, bilge water, excess cement slurry, mud cuttings cement at sea floor, and completion fluids. The drill rig will also be authorized under the Environmental Protection Agency's (EPA's) Vessel General Permit for deck washdown and runoff, gray water, and gray water mixed with sewage discharges. Drilling wastes include drilling fluids, known as mud, rock cuttings, and formation waters. Drilling wastes (non-hydrocarbon) will be discharged to the Cook Inlet under the approved APDES general permit.

Drilling wastes (hydrocarbon) will be delivered to an onshore permitted location for disposal. BlueCrest will conduct an Environmental Monitoring Study of relevant hydrographic, sediment hydrocarbon, and heavy metal data from surveys conducted before and during drilling mud disposal and at least 1 year after drilling operations cease in accordance with the APDES general permit for discharges of drilling muds and cuttings.

Non-drilling wastewater includes deck drainage, sanitary waste, domestic waste, blowout preventer fluid, boiler blowdown, fire control test water, bilge water, noncontact cooling water, and uncontaminated ballast water. Non-drilling wastewater will be discharged into Cook Inlet

under the approved APDES general permit or delivered to an onshore permitted location for disposal. Mud cuttings will be constantly tested. Hydrocarbon-contaminated muds will be hauled offsite. Solid waste (e.g., packaging, domestic trash) will be classified, segregated, and labeled as general, universal, and Resource Conservation and Recovery Act exempt or nonexempt waste. Solid waste will be stored in containers at designated accumulation areas until it can be packaged and transported to an approved onshore disposal facility. Hazardous wastes should not be generated as a result of this project. However, if any hazardous wastes are generated, they will be temporarily stored in an onboard satellite accumulation area and then transported offsite for disposal at an approved facility.

Discharging drill cuttings or other liquid waste streams generated by the drilling rig—even in permitted amounts—could potentially affect marine mammal habitat. Toxins could persist in the water column, which could have an impact on marine mammal prey species. However, despite a considerable amount of investment in research on exposures of marine mammals to organochlorines or other toxins, no marine mammal deaths in the wild can be conclusively linked to the direct exposure to such substances (O’Shea 1999).

Drilling muds and cuttings discharged to the seafloor can lead to localized increased turbidity and increase in background concentrations of barium and occasionally other metals in sediments and may affect lower trophic organisms. Drilling muds are composed primarily of bentonite (clay), and the toxicity is, therefore, low. Heavy metals in the mud may be absorbed by benthic organisms, but studies have shown that heavy metals do not bio-magnify in marine food webs (Neff et al. 1989). Effects on benthic communities are nearly always restricted to a zone within

about 100 to 150 m (328 to 492 ft) of the discharge, where cuttings accumulations are greatest. Discharges and drill cuttings could impact fish by displacing them from the affected area. No water quality impacts are anticipated from permitted discharges that would negatively affect habitat for Cook Inlet sea otters.

Potential Impacts from an Oil Spill or Unpermitted Discharge

The probability of an oil spill from the proposed activities is low. Potential sources would be a release from a support vessel or an incident associated with BlueCrest's exploratory drilling (while the target of that drilling is natural gas, there is still a remote possibility of an oil spill). An oil spill or unpermitted discharge is an illegal act; IHAs do not authorize takes of sea otters caused by illegal or unpermitted activities.

If an oil spill did occur, the most likely impact upon sea otters would be mortality due to exposure to and ingestion of spilled oil. Also, contamination of sea otter habitat, their invertebrate prey, and prey habitat would most likely result in a range of impacts ranging from sublethal to lethal, depending on a wide variety of factors. Spill response activities are not likely to disturb the prey items of sea otters sufficiently to cause more than minor effects. Spill response activities could cause sea otters to avoid contaminated habitat that is being cleaned.

Based on the preceding discussion of potential types and likelihood of impacts to sea otters, their prey, and habitat, the Service anticipates that the proposed activities are not likely to cause more than negligible, short-term, and temporary impacts to a small number of sea otters and to a small

fraction of sea otter habitat.

Potential Impacts on Subsistence Needs

According to the IHA applications, Apache, SAE, and BlueCrest have contacted all potentially affected subsistence communities, and the communities have expressed no concerns regarding the potential impacts upon the availability of sea otters for subsistence use (see proposed EAs at <http://alaska.fws.gov/fisheries/mmm/itr.htm>). Data from the Service's Marine Mammal Marking, Tagging, and Reporting Program (MTRP) indicates that the mean reported annual subsistence take from 2009 through 2013 from communities that reported harvest of sea otters in or near the proposed project areas was 124 animals (USFWS MTRP unpub. data). The number of sea otters harvested for subsistence in Cook Inlet is relatively small compared to other areas. In addition, meetings with affected communities held by the companies that discussed these proposed activities did not reveal concern that these activities would impact sea otters. Therefore, the Service anticipates no impacts on subsistence uses of sea otters will result from any of the proposed activities or from the issuance of the proposed IHAs.

Proposed Mitigation Measures

Holders of an IHA must use methods and conduct activities in a manner that minimizes to the greatest extent practicable adverse impacts on sea otters, their habitat, and on the availability of sea otters for subsistence uses. Adaptive management approaches, such as temporal or spatial limitations in response to the presence of sea otters in a particular place or time or the occurrence

of sea otters engaged in a particularly sensitive activity (such as feeding), must be used to avoid or minimize interactions with sea otters, and subsistence users of these resources.

We require holders of an IHA to cooperate with the Service and other designated Federal, State, and local agencies to monitor the impacts of oil and gas exploration activities on sea otters. The following mitigation measures are proposed to be included in the individual IHAs.

Operating conditions for operational and support vessels:

- Operational and support vessels must be staffed with trained and qualified observers to alert crew of the presence of sea otters and initiate adaptive mitigation responses.
- Vessel operators must take every precaution to avoid harassment to sea otters when a vessel is operating near these animals.
- Vessels must reduce speed and maintain a distance of 100 m (328 ft) from all sea otters when practicable.
- Vessels may not be operated in such a way as to separate members of a group of sea otters from other members of the group.
- When weather conditions require, such as when visibility drops, vessels should adjust speed accordingly to avoid the likelihood of injury to sea otters.
- All vessels must avoid areas of active or anticipated subsistence hunting for sea otters as determined through community consultations.
- We may require a monitor on the site of the activity or onboard drillships, drill rigs, support vessels, aircraft, or vehicles to monitor the impacts of an activity on sea otters.

Operating conditions for aircraft:

- Operators of support aircraft must, at all times, conduct their activities at the maximum distance possible from sea otters.
- Fixed-wing aircraft must operate at an altitude no lower than 91 m (300 ft) in the vicinity of sea otters.
- Rotary winged aircraft (helicopters) must operate at an altitude no lower than 305 m (1,000 ft) in the vicinity of sea otters.
- When weather conditions do not safely allow the required minimum altitudes stipulated above, such as during severe storms or when cloud cover is low, aircraft may be operated at lower altitudes.
- When aircraft are operated at altitudes below the required minimum altitudes, the operator must avoid known sea otter locations and should take precautions to avoid flying directly over these areas.
- Aircraft routes must be planned to minimize any potential conflict with active or anticipated sea otter subsistence hunting activity as determined through community consultations.

Offshore seismic surveys:

Any offshore exploration activity expected to include the production of pulsed underwater sounds with sound source levels ≥ 160 dB re 1 μ Pa will be required to establish and monitor acoustic exclusion and disturbance zones and implement adaptive mitigation measures as

follows:

- Monitor zones. Establish and monitor with trained and qualified observers an acoustically verified disturbance zone surrounding seismic source arrays where the received level will be ≥ 180 dB re 1 μ Pa and an acoustically verified exclusion zone surrounding seismic source arrays where the received level will be ≥ 190 dB re 1 μ Pa.
- Ramp-up procedures. For all seismic surveys, including airgun testing, use the following ramp-up procedures to allow marine mammals to depart the disturbance zone before seismic surveying begins.
 - Visually monitor the disturbance zone and adjacent waters for sea otters for at least 30 minutes before initiating ramp-up procedures. If no sea otters are detected, you may initiate ramp-up procedures. Do not initiate ramp-up procedures at night or when you cannot visually monitor the disturbance zone for marine mammals.
 - Initiate ramp-up procedures by firing a single airgun. The preferred airgun to begin with should be the smallest airgun, in terms of energy output (dB) and volume (cubic inches).
 - Continue ramp-up by gradually activating additional airguns over a period of at least 20 minutes, but no longer than 40 minutes, until the desired operating level of the airgun array is obtained.
- Power down/Shutdown. Immediately power down or shutdown the seismic source array and/or other acoustic sources whenever one or more sea otters are sighted close to or

within the area delineated by the 180 dB re 1 μ Pa disturbance zone. If the power down operation cannot reduce the received sound pressure level to 160 dB re 1 μ Pa or less, the operator must immediately shut down the seismic airgun array and/or other acoustic sources.

- Emergency shutdown. If observations are made or credible reports are received that one or more sea otters are within the area of the seismic survey and are indicating acute distress, such as any injury due to seismic noise, the seismic airgun array will be immediately shutdown and the Service contacted. The airgun array will not be restarted until review and approval by the Service.

Monitoring and Reporting Requirements

Monitoring Requirements

Holders of an IHA will be required to:

- Maintain trained and qualified onsite observers to carry out monitoring programs for sea otters necessary for initiating adaptive mitigation responses.
- Place trained and qualified observers on board all operational and support vessels to alert crew of the presence of sea otters to initiate adaptive mitigation responses and to carry out specified monitoring activities identified in the marine mammal monitoring and mitigation plan necessary to evaluate the impact of authorized activities on sea otters and the subsistence use of sea otters.

- Cooperate with the Service and other designated Federal, State, and local agencies to monitor the impacts of oil and gas exploration activities on sea otters.

Reporting Requirements

Holders of an IHA must keep the Service informed on the progress of authorized activities by:

- Notifying the Service at least 48 hours prior to the onset of activities.
- Providing weekly progress reports of authorized activities noting any significant changes in operating state and or location.
- Notifying the Service within 48 hours of ending activity.

Weekly observation reports

Holders of an IHA must report, on a weekly basis, observations of sea otters during project activities. Information within the observation report will include, but is not limited to:

- Date, time, and location of each sighting.
- Number, sex, and age (if determinable).
- Observer name, company name, vessel name or aircraft number, letter of authorization number, and contact information.
- Weather, visibility, and sea conditions at the time of observation.
- Estimated distance from the animal or group when initially sighted, at closest approach, and end of the encounter.
- Industry activity at time of sighting and throughout the encounter. If a seismic survey,

record the estimated ensonification zone where animals are observed.

- Behavior of animals at initial sighting, any change in behavior during the observation period, and distance from Industry activity associated with those behavioral changes.
- Detailed description of the encounter.
- Duration of the encounter.
- Duration of any behavioral response (e.g., diving, swimming, splashing, etc.).
- Mitigation actions taken.

Notification of incident report

Holders of an IHA must report to the Service within 24 hours:

- Any incidental lethal take or injury of a sea otter due to project activities; and
- Observations of sea otters within prescribed disturbance mitigation monitoring zones.

After-action monitoring reports

The results of monitoring efforts identified in the marine mammal monitoring and mitigation plan must be submitted to the Service for review within 90 days of the expiration date of the IHA.

The report must include, but is not limited to, the following information:

- A summary of monitoring effort including: Total hours, areas/distances, and distribution of sea otters through the project area of each rig, vessel, and aircraft.

- Analysis of factors affecting the visibility and detectability of sea otters by specified monitoring.
- Analysis of the distribution, abundance, and behavior of sea otter sightings in relation to date, location, sea conditions, and operational state.
- Estimates of take based on the number of animals encountered/km of vessel and aircraft operations by behavioral response (no response, moved away, dove, etc.), and animals encountered per day by behavioral response for stationary drilling operations.
- Raw data in electronic format (i.e., Excel spreadsheet) as specified by the Service in consultation with Industry representatives.
- Sighting rates of marine mammals during periods with and without airgun activities (and other variables that could affect detectability).
- Initial sighting distances versus airgun activity state (firing, powered down, or shut-down).
- Closest point of approach versus airgun activity state.
- Observed behaviors and types of movements versus airgun activity state.
- Numbers of sightings/individuals seen versus airgun activity state.

Findings

The Service proposes the following findings regarding this action:

Small Numbers Determination and Estimated Take by Incidental Harassment

For small take analysis, the statute and legislative history do not expressly require a specific type of numerical analysis, leaving the determination of “small” to the agency’s discretion. Factors considered in our small numbers determination include the following:

(1) *The number of northern sea otters inhabiting the proposed impact area is small relative to the size of the northern sea otter population.* The total number of sea otters that could potentially be taken by harassment in association with the proposed activity is 1,396, which is less than ten percent of the estimated population size of 18,297 (USFWS 2014).

(2) *The area where the proposed activities would occur is a relatively small fraction of the available habitat of the Southcentral Alaska stock of northern sea otters.* Since sea otters typically inhabit nearshore marine areas, shoreline length is a readily available metric that can be used to quantify sea otter habitat. The total length of shoreline within the range of the Southcentral Alaska stock of northern sea otters is approximately 2,575 km (1,600 mi), of which 540 km (335.5 mi) are located within Cook Inlet. Of that, the total length of shoreline for the proposed activities is approximately 84 km (52.2 mi), which is a small percentage of the total shoreline habitat available to the Southcentral sea otter stock. Any potential impacts to prey caused by the proposed activities would occur in the limited area of the shoreline habitat.

(3) *Monitoring requirements and mitigation measures are expected to limit the number of incidental takes.* Level A harassment (harassment that has the potential to injure sea otters) is not authorized. If a sea otter was observed within or approaching the 180 dB re 1 mPa exposure area of the various gun arrays, avoidance measures would be taken, such as decreasing the speed

of the vessel and/or implementing a power down or shutdown of the airguns. All nearshore vessel operations associated with marine geophone placements would be monitored by onsite observers. Power-up and ramp-up procedures would prevent Level A harassment and limit the number of incidental takes by Level B harassment by affording time for sea otters to leave the area. Monitoring and mitigation measures are thus expected to prevent any Level A harassment and to minimize Level B harassment. Further, monitoring and reporting of sea otter activity in proximity to activities will allow the Service to reanalyze and possibly refine and adjust future take estimates as exploration activities continue in sea otter habitat into the future.

The mitigation measures outlined above are intended to minimize the number of sea otters that may be disturbed by the proposed activity. Any impacts on individuals are expected to be limited to Level B harassment and to be of short-term duration. No take by injury or death is anticipated or authorized. Should the Service determine, based on the monitoring and reporting to be conducted throughout the survey activities, that the effects are greater than anticipated, the authorization may be modified, suspended, or revoked.

Negligible Impact

The Service finds that any incidental “take by harassment” that may result from this proposed seismic survey cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival, and would, therefore, have no more than a negligible impact on the stock. In making this finding, we considered the best available scientific information, including: (1) The biological and behavioral

characteristics of the species; (2) the most recent information on distribution and abundance of sea otters within the area of the proposed activity; (3) the potential sources of short-term disturbance during the proposed activity; and (4) the potential response of sea otters to this short-term disturbance. In addition, we conducted a thorough review of material supplied by the applicants, information from other operators in Cook Inlet, our files and datasets, data acquired from NMFS, and published reference materials. We also consulted with other sea otter experts in the Cook Inlet area, including the Service and NMFS researchers and local residents.

Limited evidence (Riedman 1983, 1984) suggests that sea otters are not particularly sensitive to or adversely affected by sound. Responses of sea otters to disturbance would most likely be diving and/or swimming away from the sound source, which may entail the temporary, but not sustained, interruption of foraging, breeding, resting, or other natural behaviors. Thus, although 1,396 sea otters (approximately 8 percent of the population) are estimated to be potentially taken (i.e., potentially disturbed) by Level B harassment by means of exposure to sound levels of 160dB re 1 mPa or greater but less than 190 dB for the duration of the project, we do not expect that this type of harassment would result in adverse effects on the species or stock through effects on annual rates of recruitment or survival.

Our finding of negligible impact applies to incidental take associated with the proposed activities as mitigated through this authorization process. These authorizations establish monitoring and reporting requirements to evaluate the potential impacts of the proposed activities, as well as mitigation measures designed to minimize interactions with, and impacts to, sea otters.

Impact on Subsistence

We find that the anticipated harassment caused by the proposed activities would not have an unmitigable adverse impact on the availability of sea otters for taking for subsistence uses. In making this finding, we considered the timing and location of the proposed activities and the timing and location of subsistence harvest activities and patterns, as reported through the MTRP, in the proposed project area, as well as the applicants' consultation with potentially affected subsistence communities. More information can be found on our website at <http://www.fws.gov/alaska/fisheries/mmm/iha.htm>.

The Service finds that the proposed activities will have a negligible impact on small numbers of sea otters in Southcentral Alaska and will not have an unmitigable adverse impact on the availability of the stock for subsistence uses. Further, we have prescribed permissible methods of take, means to have the least practicable impact on the stock and its habitat, and monitoring requirements.

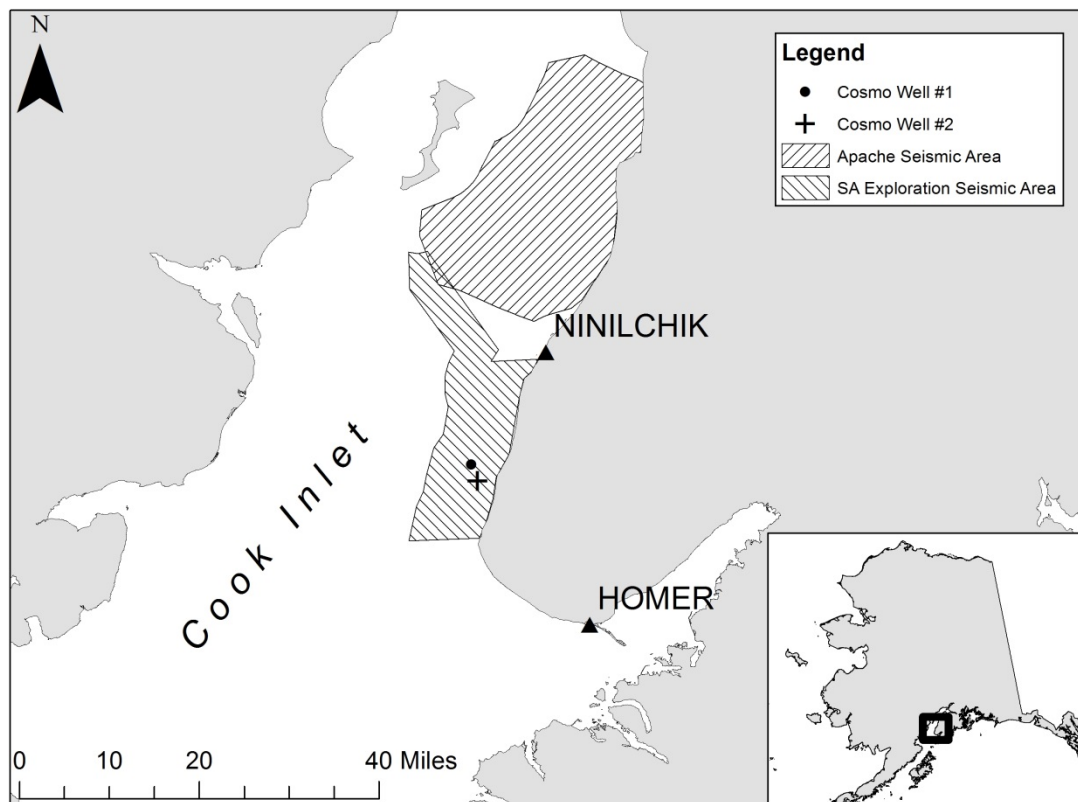


Figure 1. The area of activity for the Apache and SAE seismic surveys, as well as the drill sites for the BlueCrest exploratory drilling program, lower Cook Inlet, Alaska.

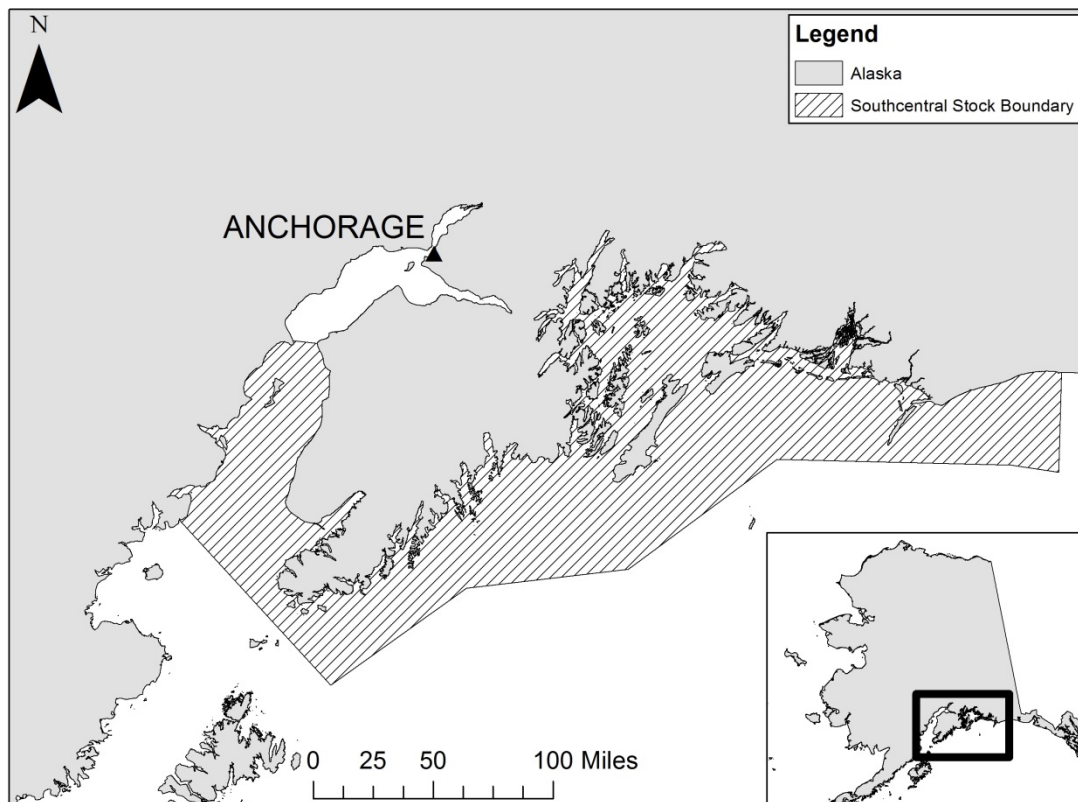


Figure 2. Approximate boundaries for the Southcentral northern sea otter stock.

Required Determinations

National Environmental Policy Act (NEPA)

We have prepared Environmental Assessments (EA) in accordance with the NEPA (42 U.S.C. 4321 et seq.). We have concluded that approval and issuance of these authorizations for the nonlethal, incidental, unintentional take by Level B harassment of small numbers of northern sea otters (*Enhydra lutris kenyoni*) in the Southcentral Alaska stock during oil and gas industry

exploration activities in the lower Cook Inlet of Alaska would not significantly affect the quality of the human environment, and that the preparation of Environmental Impact Statements on these actions is not required by section 102(2) of the NEPA or its implementing regulations. For a copy of the EAs, go to <http://www.regulations.gov> and search for Docket No. FWS–R7–ES–2014–0031, go to <http://www.fws.gov/alaska/fisheries/mmm/iha.htm>, or contact the individual identified above in **FOR FURTHER INFORMATION CONTACT**.

Endangered Species Act (ESA)

The proposed activities will occur entirely within the range of the Southcentral Alaska stock of the northern sea otter, which is not listed as threatened or endangered under the ESA.

Government-to-Government Relations with Native American Tribal Governments

In accordance with the President's memorandum of April 29, 1994, “Government to Government Relations with Native American Tribal Governments” (59 FR 22951), Executive Order 13175, Department of the Interior Secretarial Order 3225 of January 19, 2001 [Endangered Species Act and Subsistence Uses in Alaska (Supplement to Secretarial Order 3206)], Department of the Interior Secretarial Order 3317 of December 1, 2011 (Tribal Consultation and Policy), Department of the Interior Memorandum of January 18, 2001 (Alaska Government-to-Government Policy), the Department of the Interior’s manual at 512 DM 2, and the Native American Policy of the U.S. Fish and Wildlife Service, June 28, 1994, we readily acknowledge our responsibility to communicate and work directly on a Government to Government basis with

federally recognized Alaska Natives Tribes in developing programs for healthy ecosystems, to seek their full and meaningful participation in evaluating and addressing conservation concerns for listed species, to remain sensitive to Alaska Native culture, and to make information available to Alaska Natives.

We have evaluated possible effects on federally recognized Alaska Native Tribes. Through the IHA process identified in the MMPA, Industry presents a communication process, culminating in a Plan of Cooperation (POC), if warranted, with the Native communities most likely to be affected and engages these communities in numerous informational meetings.

Through various interactions and partnerships, we have determined that the issuance of these IHAs is appropriate. We are open to discussing ways to continually improve our coordination and information exchange, including through the IHA/POC process, as may be requested by Tribes or other Native groups.

Proposed Authorization

The Service proposes to issue BlueCrest Energy, Inc., Apache Alaska Corporation, and SAExploration, Inc., LLC, individual IHAs for the nonlethal, incidental, unintentional take by Level B harassment of small numbers of northern sea otters (*Enhydra lutris kenyoni*) in the Southcentral Alaska stock during industry exploration activities in the lower Cook Inlet of Alaska, as described in this document and in their individual applications. We neither anticipate nor propose authorization for take by injury or death. The final IHAs would be effective for 1

year after the date of issuance. Authorization for incidental take beyond the period specified in the final IHA will require application for a new IHA.

The final IHA for each applicant will also incorporate the mitigation, monitoring, and reporting requirements described in this proposal. The applicants will be expected and required to implement and fully comply with those requirements. These IHAs will not authorize the intentional take of northern sea otters, nor take by injury or death.

If the nature or level of activity changes or exceeds that described in this proposal and in the individual applications for IHAs, or the nature or level of take exceeds that projected in this proposal, the Service will reevaluate its findings. The Secretary may modify, suspend, or revoke these authorizations if the findings are not accurate or the mitigation, monitoring, and reporting requirements described herein are not being met.

Request for Public Comments

The Service requests interested persons to submit comments and information concerning these proposed IHAs. Consistent with section 101(a)(5)(D)(iii) of the MMPA, we are opening the comment period on this proposed authorization for 30 days (see **DATES**).

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can

ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Dated: August 1, 2014.

Geoffrey L. Haskett,

Regional Director, Alaska Region.

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